



# Ruggedly Reliable, Endlessly Versatile

Solar Solutions for Aviation, Obstruction  
& Industrial Applications

Built to exacting standards, Carmanah solar solutions offer unmatched dependability, durability and versatility. Compact, tough and designed to perform in the most demanding conditions on earth, Carmanah's solar technology has become synonymous with quality.

we put solar to work™



## Experience the freedom of solar power.

**Break free of unreliable grid connections, ongoing electrical bills and costly maintenance schedules with Carmanah solar power technology. Installing easily and cost-effectively, Carmanah solar solutions eliminate the need for large specialized work crews, lengthy construction delays and costly permit requirements.**

Operating free of electrical connections, Carmanah solar technology is ruggedly reliable, continuing to provide power and illumination regardless of blackouts, generator malfunction or electrical grid failure. As a self-sustaining energy alternative, solar solutions also eliminate the need for costly refuelling.

Built tough, Carmanah's robust construction and intelligent design offer steely performance in one compact, self-contained unit. Easy to deploy and relocate, Carmanah solar technology provides the ideal solution for permanent, temporary and emergency lighting and power requirements.

With up to five years of maintenance-free performance, Carmanah solar solutions offer the ultimate in powerful, efficient, cost-effective lighting and power solutions for aviation, obstruction and industrial applications.

Surprisingly easy to install and reliable under even the most demanding conditions, solar technology is simply an intelligent choice.

- Easy installation: no specialized work crews required for installation
- Compact, self-contained design: easy deployment and relocation
- Significant cost savings: no fuel or electrical bills
- Reduced maintenance cycles: no scheduled maintenance for up to five years
- Clean, renewable solution: a visible move towards eco-friendly practices

# There is a reason the world's most demanding customers trust Carmanah technology. Plain and simple: it performs.

Here at Carmanah, there is nothing more important than ensuring our products can meet the challenges we know they will face each and every day. That's why we take a total system approach to engineering. We pay attention to every component and work diligently to ensure that every step of the energy conversion process is maximized. It's our tireless attention to detail that makes our products the most compact, easy to install, endlessly reliable and ruggedly durable solar products on the market. When it comes to solar technology it's what's inside that counts, and here at Carmanah we look after what's inside better than anyone else. Just ask our clients.

## The Energy Conversion Process: Every step counts

At Carmanah our goal is your peace of mind. Each component of our solar products is carefully selected, integrated and configured to ensure you receive the most compact, reliable and efficient solar product possible. We expect our products to perform and so should you.

### Solar Panel

Carmanah uses only the highest quality solar panels available to ensure our solutions collect the maximum amount of energy available during sunlight hours. Allowing for increased system autonomy and aiding system performance during periods of low solar insolation, our choice in solar panels is just one of the reasons our solutions are proven to perform in some of the most difficult solar conditions on earth.

### Charge Circuit

Our charge circuits are optimized to deliver the maximum amounts of energy collected from the solar panels to the battery. This means the energy collected is the energy stored, and all of this attention to energy stockpiling translates into solar products that outlast, outperform and outshine the competition.

### Batteries

Carmanah employs the highest quality batteries available. We know our products are going to be put to the test in some of the most extreme environments on earth and we need to know our batteries are up to the challenge. Allowing for maximum charge efficiency, and offering field-proven performance within an impressive temperature range, our batteries are the powerhouse behind our reputation for dependability.

### LED Driver

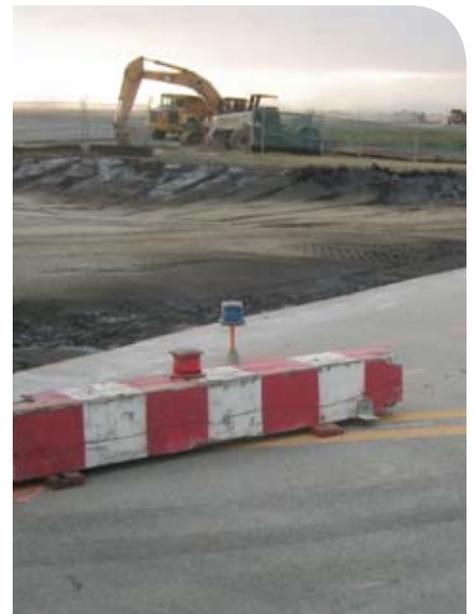
Our LED drivers are purpose built by Carmanah to deliver the optimum amount of energy to our LEDs. We know our lights are being asked to perform very specific jobs in mission critical locations, and not every job is the same. That's why we make certain our lights are delivering the right kind of illumination for the task. Our lights provide you with the purpose-specific performance you need to get down to business.

### LEDs

Carmanah integrates the most advanced LEDs on the market into each and every one of our systems. Offering high-efficiency, ultra-bright illumination, our LEDs are able to perform at the top of their game because we carefully attend to our thermal management techniques, ensuring an optimum operating environment for our LEDs. All this translates into the brightest, most reliable solar illumination possible.

### Light Management

Carmanah optics are some of the best in the world. Designed to meet the exact requirements of our self-contained solar lighting applications, the optics inside Carmanah solar lighting products make the most of the light produced. We're serious about our light output, and demand focused illumination from our products that minimizes light trespass and places light exactly where it's needed.



### Energy Management

Dynamic and responsive, our lights are the most intelligent solar solutions on the market – and we give them a lot to think about. Our lights are constantly monitoring their surroundings and can adjust light output according to prevailing solar conditions. The brain power inside our lights ensures that you receive consistent light output regardless of conditions. Our lights also accept direction – featuring on-demand functionality and intelligent operating profiles that can be pre-programmed to allow for times of less illumination according to installation needs. Our lights are always thinking, which means you can be assured of reliable performance and functionality that meets your specific needs.

Here at Carmanah we take pride in the world-class performance of our lights. From energy input to light output and energy management, we attend to every detail of the energy conversion process. Our total system approach to engineering ensures that our lights are up for the challenge, whatever it may be. As the most compact, easily installed, durable and reliable solar technology on the market our solutions do exactly what you expect them to do: perform.

Designed around the details, built to uncompromising standards: Carmanah solar solutions put solar to work unlike any other solution on the market.

# Rugged, Reliable, Adaptable: Carmanah solar lights rise to the challenge.

When lives depend upon safe navigation, reliability and performance of airfield and obstruction lighting is a must. In use for thousands of aviation and obstruction applications worldwide, Carmanah solar LED lights are trusted by some of the world's most demanding customers to perform in some of the harshest operating conditions on Earth.

With a compact, self-contained design Carmanah solar solutions offer portability and flexibility that hardwired options simply cannot match. Deployment and relocation happens quickly and easily with minimal disruption: a two-person crew can install a fully operational 5000 ft. (1524 metre) runway of Carmanah solar lights in less than an hour. Once installed, lights operate individually, eliminating concern over lighting loss due to cable malfunction or damage.

Significantly reducing regular maintenance cycles and concern over costly repairs, Carmanah solar lighting offers up to five years of maintenance-free performance and eliminates the need to replace bulbs. Lightweight, portable and compact, Carmanah solar lighting solutions provide performance and reliability designed specifically for critical applications.

Available with infrared capability and wireless functionality, Carmanah solar lights can be configured to suit the exact application for which they are installed.



## 502: low-intensity marking lights for a variety of marking applications

- Up to 1.2cd of intensity
- Dusk-to-dawn operation
- 7 flash patterns
- User programmable
- Available in red, green, amber, white and blue colour outputs

For more information, please see 502 specifications on page 8.



## A601: durable, reliable, low intensity airfield and obstruction lighting

- Up to 11cd of intensity in flash mode
- Dusk-to-dawn operation
- Up to 250 flash patterns
- User programmable
- Available with clear or coloured lens
- Available in red, green, amber, white and blue colour outputs

For more information, please see A601 specifications on page 8.



## A702 Series: the first solar light in the world used on commercial and defense airfields

- Up to 18cd of intensity in flash mode
- Dusk-to-dawn operation
- Optional flash synchronization using GPS for a series of lights
- Optional infrared capabilities
- Optional onboard push-button switch with four intensity settings including emergency operations
- Available in red, green, amber, white, blue and threshold red/green, red/white and amber/white colour outputs

For more information, please see the A702 specifications on page 8 & 9.



### **A704-5 : the most advanced solar aviation and obstruction lighting solution on the market**

- Up to 44.3cd of intensity in auto-high mode
- Optional wireless remote control with 4km (2.5 mile) range
- High-intensity visible and infrared dual-mode LEDs
- Integrated carrying handle
- Auxiliary AC/DC charging capability for indoor storage or trailer transport
- Compatible with night vision goggles
- Dusk-to-dawn or on-command operation
- Available in red, green, amber, white, blue and threshold red/green, red/white and amber/white color outputs

For more information, please see the A704-5 specifications on page 9.



### **A704-5 Wireless Handheld Controller**

- Up to 4km (2.5 mile) range
- Password protected to ensure secure control of lights in a system
- Direct and secure linkage between controller and system using UCS data
- Switch between visible and infrared modes
- Switch between intensity levels
- Turn lights on and off



### **Solar Power Windsock**

Featuring crisp LED illumination, the Carmanah internally-illuminated LED solar windsock utilizes proven solar technology to provide a flexible and adaptable windsock solution that can be placed anywhere it's needed.

With dusk-to-dawn operation, Carmanah solar windsocks improve the visibility of wind direction in night and low-light conditions. Carmanah windsock provides both permanent and portable options.

For more information, please contact Carmanah.



### **Solar LED Airfield Sign Light**

Bringing light to airfield signs in even the most remote locations, Carmanah solar LED airfield sign lighting allows for increased safety on every corner of an airfield. Used to illuminate on-airfield signage and distance-to-go markers, solar airfield sign lighting increases airfield navigability and pilot comfort in night and low-visibility conditions.

Completely immune from electrical grid failures, Carmanah solar LED airfield sign lighting provides reliable dusk-to-dawn illumination for critical signage, allowing for uncompromising safety when it's needed most.



# Aviation Mounting Accessories

Carmanah purpose-built mounting equipment makes installing Carmanah solar aviation lights quick, efficient and secure. Carmanah mounting accessories complement the A601 and A700 series aviation lights for stake and surface mounting.



### Mounting Bolt Kits:

These kits contain all the required hardware to successfully mount one light to the correct mounting plate.



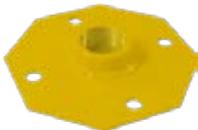
### Mounting Plates:

Provide a secure fit into the bottom of Carmanah's aviation lights and aid installation on concrete or dirt surfaces. Carmanah's mounting plates are manufactured from aluminum and powder coated aviation yellow for daytime visual guidance.



### Frangible Couplings:

In both 1.5" or 2" to 1", for stake mount and floor flange installations on concrete and dirt mount surfaces.



### Floor Flange:

In either 1.5" or 2", designed for concrete installations using the frangible coupling.



### Airport Mounting Stake:

Allows for permanent installation in earth and gravel environments.



### Wedge Anchor Bolt:

Used to secure the 1.5" or 2" Floor Flange to concrete.

# A704-5

Optional wireless control: Secure 900 MHz wireless control from up to 4km (2.5 miles) away. Controls on/off functions, visible/IR mode selection and intensity levels.

Ultra-bright LEDs: featuring innovative optic and lens design for optimum light divergence. Infrared and visible modes.

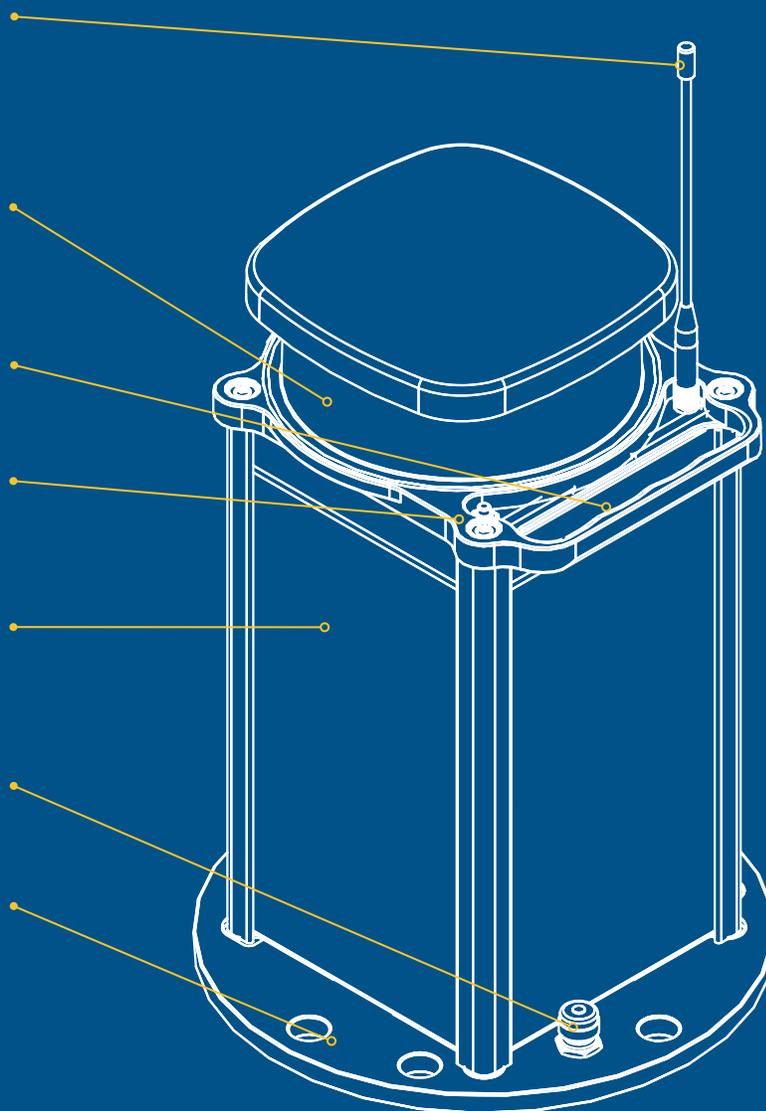
Built-in handle: for easy deployment and portability.

Push button switch: For full programming function including: intensity levels, daytime and emergency function, and battery check.

Rugged construction: self-contained unit is entirely sealed from water and dust, corrosion and vandal resistant.

External service port: offers 12V DC power charging capabilities.

Multiple mounting patterns: allows for three and four bolt mounting patterns.



Light	Application					
	Obstruction	Barricade	Runway	Taxiway	Threshold	Helipad
502	x	x				
A601	x	x		x		
A702/702-5	x	x	x	x	x	x
A704-5	x	x	x	x	x	x

502

**DIMENSIONS**

Height	4.4" (113 mm)
Width	6.05" (154 mm)

**SPECIFICATIONS****LIGHT OUTPUT AND OPERATION**

Flashing	~1.2 cd
Vertical divergence	—
Autonomy (flashing) at full charge	300 hours
Available LED colour	Red, green, blue, amber, or white
Coloured lens option	Yes
Ambient Operating Temperature	-22 to 122 °F (-30 to 50 °C)
Ambient Storage Temperature	-40 to 176 °F (-40 to 80 °C)
Programmable	Infrared

**CONSTRUCTION**

Battery (average 5-year life)	Non-replaceable
Mounting options	2 Bolt
Weight	2.45 lb (1.1 kg)
Waterproof	Yes

**ACCESSORIES**

	Infrared Programmer Security Bolt Mounting plate
--	--

A601

**DIMENSIONS**

Height	5.51" (140 mm)
Width	6.87" (175 mm)

**SPECIFICATIONS****LIGHT OUTPUT AND OPERATION**

Flashing	~11 cd
Steady ON	~4 cd
Vertical divergence	0 to 6°
Autonomy (flashing) at full charge	300 hours
Available LED colour	Red, green, amber, blue or white
Coloured lens option	Yes
Ambient Operating Temperature	-22 to 122 °F (-30 to 50 °C)
Ambient Storage Temperature	-40 to 176 °F (-40 to 80 °C)
Programmable	Infrared

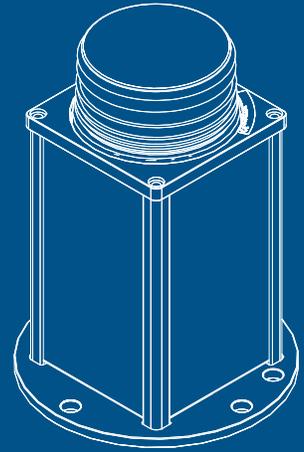
**CONSTRUCTION**

Battery (average 5-year life)	Non-replaceable
Mounting options	3 bolt
Weight	4.85 lb (2.2 kg)
Waterproof	Yes

**ACCESSORIES**

	Infrared Programmer Security Bolt Mounting Plate Bird Deterrent Frangible Coupling Stake Mounting System Stake Tapper
--	---

A702

**DIMENSIONS**

Height	13" (330 mm)
Width	9.25" (235 mm)

**SPECIFICATIONS****LIGHT OUTPUT AND OPERATION**

Flashing	~18 cd
Steady ON	~6 cd
Vertical divergence	0 to 6°
Autonomy (flashing) at full charge	300 hours
Available LED colour <sup>3</sup>	Red, green, amber, blue Infrared Split lens (Red/Green or Amber/White)
Coloured lens option	Yes
Ambient Operating Temperature	-22 to 122 °F (-30 to 50 °C)
Ambient Storage Temperature	-40 to 176 °F (-40 to 80 °C)
Programmable	Infrared, Push button

**CONSTRUCTION**

Battery (average 5-year life)	Replaceable and recyclable
Mounting options	3 or 4 bolt
Weight	17 lb (7.75 kg)
Waterproof	Yes

**ACCESSORIES**

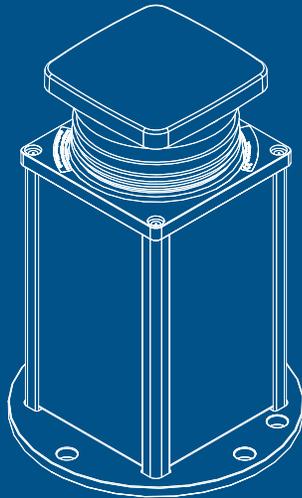
	Infrared Programmer Mounting Bolt Kit Mounting plate Frangible Coupling Stake Mounting System Stake Tapper Unidirectional Shield
--	--

All specifications are subject to change without notice.

<sup>2</sup> Warm white casts a light that is slightly yellow and warmer in tone than pure white; please specify whether you require warm or pure white version at time of ordering.

<sup>3</sup> All specifications are subject to change without notice. Bi-color (split-lens) A704-5 lights emit light of one color to one side, and light of a different color to the other side.

# A702-5



## DIMENSIONS

Height	13.375" (340 mm)
Width	9.25" (235 mm)

## SPECIFICATIONS

### LIGHT OUTPUT AND OPERATION

Flashing	13 cd
Steady ON	18 cd
Vertical divergence	0° to 6°
Autonomy (flashing) at full charge	150 hours
Available LED colour	Red, green, amber, blue or white
Coloured lens option	No
Ambient Operating Temperature	-22 to 122 °F (-30 to 50 °C)
Ambient Storage Temperature	-40 to 176 °F (-40 to 80 °C)
Programmable	Infrared, Push button

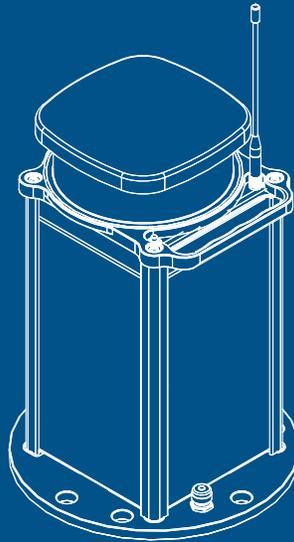
### CONSTRUCTION

Battery (average 5-year life)	Replaceable and recyclable
Mounting options	3 or 4 bolt
Weight	17 lb (7.75 kg)
Waterproof	Yes

### ACCESSORIES

Infrared Programmer  
Mounting Bolt Kit  
Mounting plate  
Frangible Coupling  
Stake Mounting System  
Stake Tapper  
Bird Deterrent

# A704-5



## DIMENSIONS

Height (with antenna)	17.6" (448 mm)
Height (without antenna)	13.375" (340 mm)
Width	9.25" (235 mm)

## SPECIFICATIONS

### LIGHT OUTPUT AND OPERATION

Flashing	—
Steady ON	44.3 cd Auto-high
Vertical divergence	0° to 30°
Autonomy (flashing) at full charge	350 hours
Available LED colour <sup>2,3</sup>	Warm White Cool White Red, Green, Red/Green Red/Warm White Amber/Warm White Amber/Cool White
Ambient Operating Temperature	-22 to 122 °F (-30 to 50 °C)
Ambient Storage Temperature	-40 to 176 °F (-40 to 80 °C)
Wireless Radio Receiver	902-928 MHz FHSS
External Service Port	12 V DC
Programmable	Hand-held controller, Push button

### CONSTRUCTION

Battery (average 5-year life)	Replaceable and recyclable
Mounting options	3 or 4 bolt
Weight	26 lb (11.75 kg)

### ACCESSORIES

Hand-held Controller  
AC/DC Charger  
Mounting Bolt Kit  
Mounting plate  
Frangible Coupling  
Stake Mounting System  
Stake Tapper  
Bird Deterrent  
Unidirectional Shield

# Windsock



Please contact Carmanah for more information on our Solar-Powered Illuminated Windsock.

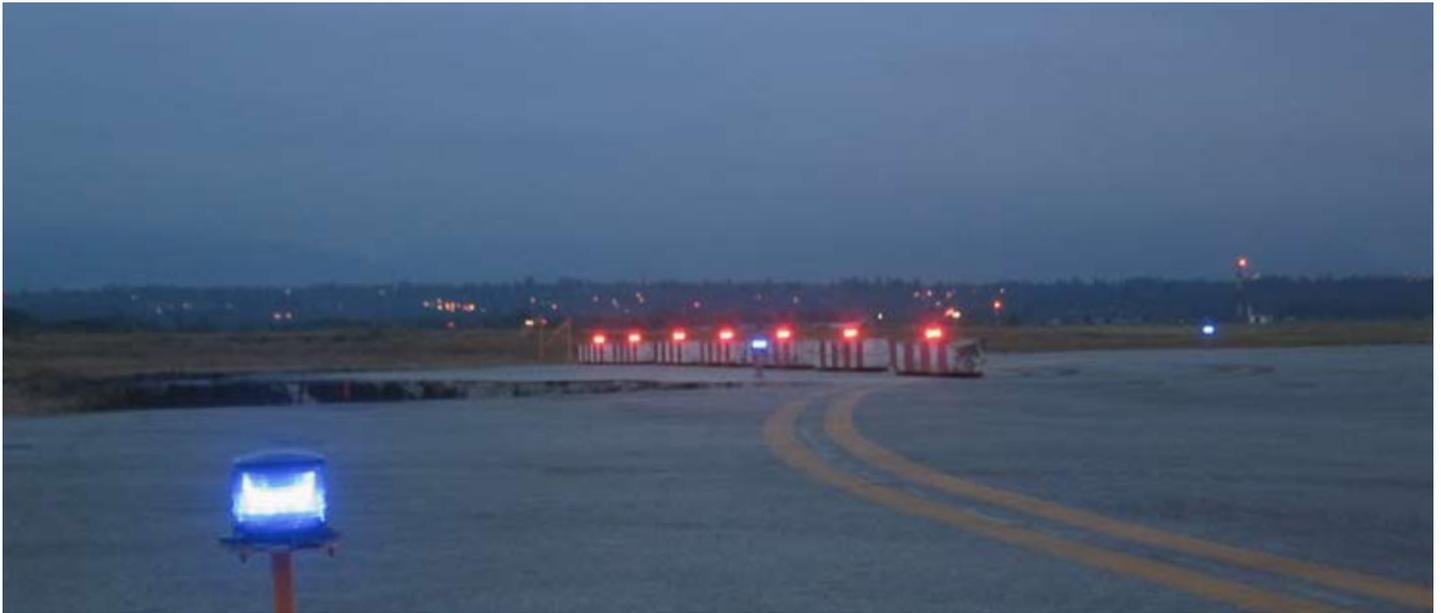
An essential airfield and helipad accessory, windsocks are required to be lit on every airfield and helipad worldwide. Used to help pilots better determine wind direction from a greater distance, windsocks increase the safety of landings at night and in low-visibility conditions.

# Solar LED Airfield Sign Light



Please contact Carmanah for more information on our Solar LED Airfield Sign Light.

Carmanah Solar LED Airfield Sign Lighting delivers consistent, reliable spotlighting to improve the visibility and legibility of on-airfield signs and distance-to-go markers. With no connection to the electrical grid, Carmanah solar airfield sign lighting provides for increased safety on every corner of an airfield.



**Client: Vancouver International Airport (YVR)**

**Location:**  
Vancouver, B.C. Canada

**Goal:**  
To easily and cost-effectively illuminate portable barricades for regular maintenance and upgrade projects.

**Details of contract:**  
Carmanah lights were trialed for three months

After successful trial, Carmanah lights were installed on multiple runway barricades

Carmanah Model A601 lights have been in use at YVR since May 2004 for illuminating taxiway construction projects.

Vancouver International Airport (YVR) is Canada's second busiest airport, serving over 16 million passengers and accommodating over 45,000 arrivals and departures in 2006 alone. In the summer of 2004, the Vancouver International Airport Authority initiated a number of major projects on YVR's south airfield. YVR required reliable lighting for portable barricades. With no cabling or wiring, Carmanah model A601 solar LED barricade lights provided the ideal solution.



"I am just writing you a note to say how happy we are with your product. We had been looking for a way to light up our 60 metre tubular towers and had been getting some pretty scary quotes from some other lighting companies. When we found out about your products - their ease of use, their longevity, the fact that they do not need an external power source - we immediately put them to the test.

After finding us a contractor to custom make some mounting brackets for us (thanks again), we attached the lights and began erecting the first of the tilt up towers. Unfortunately one of the anchors came loose during erection and the tower came down from a height of about 30 feet. When we went to inspect the damage we found that the tower had fallen right on top of one of the lights which was now embedded deep in the ground....To our amazement it still worked as good as new. I can't think of another lighting option that we looked at that would have remained intact after such a blow.

We will definitely be using Carmanah for all our future lighting needs and would recommend your products to anyone."

Director, SED Technologies Inc., USA



**Client: Bahamas Department Civil Aviation (CAD)**

**Location:**  
Bahamas, 16 Family Island Airports

**Goal:**  
To increase safety and develop necessary infrastructure for remote Family Island airports and communities.

**Details of Contract:**

- Savings of more than \$10M in upfront capital costs
- Zero energy costs over 20 years
- Installed a complete airfield each day
- 1/10th the cost of a hardwired system
- 24-hour on-demand operation

Bahamas Family Island airports serve smaller jets with domestic and international tourist traffic, as well as providing service to 24-hour medevac emergency operations. Conventional hardwired airfield lighting was cost-prohibitive and logistically impractical to install and operate at the majority of Bahamas Family Island airports, leaving them without any airfield lighting solution.



“For years, Family Island residents have complained about the lack of runway lighting. During emergencies, residents have been forced to park their cars on the runway and turn on their headlights to act as a type of guide for landing airplanes,” officials said.\* “Bahamas CAD required a cost-effective lighting solution that required no electrical infrastructure and little technical expertise to install and maintain. Carmanah’s field-proven, reliable solar LED lighting was the ideal solution.”

\*Bahamas, The Bahamas Journal, PM Commissions Runway Lights At Family Island Airports, By Rogan M. Smith



“The aircraft parks and heavy equipment rushes up to the ramp to begin the offload. These are large pieces of equipment. They have the ability to pick up a box with over 20,000 pounds of cargo inside. One of the tractors runs over a taxiway light. No problem. Carmanah builds quality equipment. As you can see by the picture, despite being run over, and [dragged] over a taxiway and desert sand for more than fifteen feet, the light still shines, [providing] a secure path for the aircraft and equipment to operate on.”

Airfield Operations, USMC

Carmanah's innovative solar technology suite doesn't stop with just solar lighting for aviation and industrial applications. The company's product line also includes general lighting and power system solutions for a wide variety of applications.



### Solar Area Lighting

Experience the empowerment of solar area lighting. Featuring an intelligent operating profile and the most advanced LED technology on the market, Carmanah's solar area lighting solution provides industry leading performance and light control features that are unmatched by any other solar lighting solution on the market.

For more information, please see Carmanah's solar area lighting brochure.



### DuraGEN™ Solar Engine

Designed as a standalone power supply, the DuraGEN Solar Engine comes as one complete, easy to install system that arrives pre-assembled, pre-wired and ready for use. The DuraGEN Solar Engine is available in a variety of standard outputs and configurations to accommodate a wide range of remote power needs.

For more information, please see Carmanah's DuraGEN Solar Engine brochure.



### Solar Flashing Beacons

Carmanah's flashing beacons provide added visibility to important safety and roadside signage. Ideal for areas with high pedestrian or vehicle traffic, industrial worksites where signs may not be easily visible and unmarked railway crossings in remote and isolated locations, Carmanah solar flashing beacons are simple to install and integrate easily onto existing sign posts.

For more information, please see Carmanah's Solar Solutions for the Traffic Industry brochure.

## About Carmanah Technologies Corporation

As one of the most trusted names in solar technology, Carmanah has earned a reputation for delivering strong and effective products for industrial applications worldwide. Industry proven to perform reliably in some of the world's harshest environments, Carmanah's lights and power systems provide a durable, dependable and cost effective energy alternative.

### Carmanah Technologies Corp.

Toll free: 1.877.722.8877  
(US & Canada)  
Worldwide: 1.250.380.0052  
Fax: 1.250.380.0062  
WebSite: carmanah.com

For more information or to find the regional office nearest you, please visit [carmanah.com](http://carmanah.com).



Specifications may be subject to change.

Carmanah is a Canadian public corporation - TSX: CMH  
© 2008 Carmanah Technologies Corp.

All rights reserved. Carmanah®, DuraGEN™, EverGEN™ AND MICROSOURCE® are trademarks or registered trademarks of Carmanah Technologies Corporation.  
Document: TechBro\_AOI\_vA

[carmanah.com](http://carmanah.com)